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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,783	10/06/2003	William Dale Jones	SSI-04001	5859
28960	7590	07/13/2006	EXAMINER	
HAVERSTOCK & OWENS LLP 162 NORTH WOLFE ROAD SUNNYVALE, CA 94086			LUND, JEFFRIE ROBERT	
			ART UNIT	PAPER NUMBER

1763

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/680,783

Applicant(s)

JONES, WILLIAM DALE

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-24 is/are pending in the application.
- 4a) Of the above claim(s) 11-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: in the abstract, on page 3 line 12, on page 4 line 3, and in claim 3, P1 equals sealing pressure and P2 equals processing pressure. On page 27 line 17 P1 equals processing volume and P2 equals seal pressure. P1 and P2 need to be uniformly defined throughout the specification and claims.

On page 3 line 12, on page 4 line 3, and in claim 3, equation 1 is $\Delta F = P1 * A1 - P2 * A2$, and on page 27 lines 7 and 10 equation 1 is $\Delta F = P2 * A2 - P1 * A1$. Equation 1 needs to be uniformly defined throughout the specification and claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 2, 4-10, 17-21 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

a. In claim 1, the newly added limitation "range selected from a plurality of ranges" is not described in the specification in such a way as to enable one

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skilled in the art to determine what “range” or the “plurality of ranges”.

b. In claim 10, the new limitation “means for non-linearly varying the sealing pressure” is not described in the specification. The specification describes sealing pressure varies non-linearly with the processing pressure. The sealing pressure is not non-linearly varied; instead, due to the different size of A1 and A2, the sealing pressure varies non-linearly with the processing pressure.

c. In claim 24, the newly added limitation “an algorithm to determine the sealing force, the algorithm accounting for non-linear variations between the sealing force, the force generated within the processing volume, and the difference between the sealing force and the force generated within the processing volume” is not described in the specification. The specification does not describe any specific algorithm.

4. Claims 23 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly added limitation “the range is independent of the pressures generated within the processing volume” is not taught or suggested in the specification. All of the ranges suggested in the specification are dependent on the pressures generated within the processing volume.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

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form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 5-10, and 17-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Biberger et al, US Patent 6,921,456 B2.

Biberger et al teaches a supercritical CO₂ processing apparatus that includes: an upper element 42, 46; a lower element 34 which is configured to be brought together with the upper element to form a processing chamber 44; and a hydraulic piston seal energizer 54 controlled by a controller configured to maintain the upper element against the lower element to maintain the processing volume and to control the sealing pressure that varies non-linearly with the processing pressure within the processing chamber. The controller controls the processing volume by maintaining the sealing force higher than the force generated by the processing volume within a range with a lower limit defined by the sealing force greater than the force needed to maintain the processing volume and an upper limit defined by a force lower than the force at which the seal fails. The seal energizer is configured to minimize the force against one of the upper element and the lower element above a threshold value (i.e. a value above the force needed to maintain the processing volume), and maintains the net force in accordance with the formula $P1 \cdot A1 - P2 \cdot A2$. A1 is greater than A2. (Entire document, specifically, Figure 3)

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The Examiner notes that the non-linear relationship between the sealing pressure and processing pressure is inherent in the structure of the lower element and the seal energizer. Furthermore, the limitation "by maintaining a difference between a sealing force and a force generated within the processing volume within a range selected from a plurality of ranges, the force generated within the processing volume produced by a processing pressure that varies between a vacuum and a supercritical pressure" is an intended use of the apparatus, and the apparatus of Biberger et al is capable of operating in any range.

7. Claims 1, 2, 5, 6, 8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Fahringer US Patent 2,873,597.

Fahringer teaches supercritical apparatus for processing an article, comprising: an upper element 14; a lower element 10 wherein the upper element and the lower element are brought together to form a processing volume; a means for sealing (30, 31) wherein the means for sealing couples the upper element to the lower element to maintain the processing volume by generating a sealing force in a seal-energizing cavity (40) to counterbalance a processing force generated within the processing volume; and a seal energizer 43, which intensifies a first pressure to produce a sealing pressure larger than the first pressure, the sealing pressure used to generate the sealing force. The seal energizer maintains the net force in accordance with the formula $P1 \cdot A1 - P2 \cdot A2$. (Entire document) The Examiner notes that the non-linear relationship between the sealing pressure and processing pressure is inherent in the structure of the sealing means of Fahringer. Furthermore, the limitation "by maintaining a difference between a

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sealing force and a force generated within the processing volume within a range selected from a plurality of ranges, the force generated within the processing volume produced by a processing pressure that varies between a vacuum and a supercritical pressure" is an intended use of the apparatus, and the apparatus of Fahringer is capable of operating in the claimed range or any other range.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-10 and 17-24 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 7,077,917 ('917). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '917 teach all the claimed elements of the present invention. Specifically, claim 1 of '917 teaches an upper element, a lower element, and a means for sealing. The means for sealing includes the embodiments shown in figures 8-11, which teach the seal energizer and that A1 is larger than A2. The size of A1 to A2 is the cause of the non-linear relationship between

the sealing pressure and the pressure generated in the processing system. The selected range is the minimum force needed maintain the processing volume to the force needed to break one of the upper or lower elements, and is an intended use of the apparatus, and the apparatus of '917 is capable of operating at any of the claimed plurality of ranges.

Response to Arguments

10. Applicant's arguments, see pages 6-7, filed March 30, 2006, with respect to the new matter (112, 1st paragraph) rejection of claims 1-10 and 17-21 have been fully considered and are persuasive. The rejection of claims 1-10, 17-21 has been withdrawn. The Examiner notes that limitations from the specification cannot be read into the claims. If the Applicant desires the limitations taught in the specification regarding the range, then that limitation must be claimed.

11. Applicant's arguments filed November 7, 2005 have been fully considered but they are not persuasive.

In regard to the argument that Biberger et al, Fahringer, or U.S. Patent 7,077,917 ('917) does not teach, "maintaining a difference between a sealing force and a force generated within the processing volume within a range selected from a plurality of ranges, the force generated within the processing volume produced by a processing pressure that varies between a vacuum and a supercritical pressure", the Examiner disagrees. The new limitation is extremely broad and does not really limit the apparatus because in order to function the apparatus must have some range selected from a plurality of ranges. In the apparatus of Biberger et al, Fahringer, or '917, all the

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apparatus have an infinite number of force ranges from which they can operate, and all teach at a minimum the range defined by the minimum force needed to maintain the processing volume and the maximum force at which the upper and lower elements break. Thus, Biberger et al, Fahringer, and '917 all teach the claim limitation.

In regard to the argument that Biberger et al does not teach "the seal energizer is configured to minimize a non-negative net force against one of the upper element and the lower element above a threshold value", the Examiner disagrees. The rejection has been clarified to more clearly teach this limitation. The Examiner further notes that this limitation is an intended use of the apparatus and the apparatus of Biberger et al is capable of operating as near to the force required to maintain the processing volume as required.

In regard to the argument that Biberger et al, Fahringer, or U.S. Patent 7,077,917 ('917) does not teach "non-linearly varying a sealing pressure"(claim 10) or "generating a sealing pressure that varies non-linearly with the processing pressure" (claim 22), the Examiner disagrees. To begin with, the terms "non-linearly varying a sealing pressure"(claim 10) or "generating a sealing pressure that varies non-linearly with the processing pressure" are not really clear because they do not describe how the pressure is supplied. They are used to describe a relationship between the ΔF and the pressure and area. The specification does not really teach "a sealing pressure that varies non-linearly with the processing pressure". Instead, the specification teaches the relationship taught by the formula $\Delta F = P1 \cdot A1 - P2 \cdot A2$. Specifically, the specification teaches on page 26 and 27 that:

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It is believed that when (1) the first face of a plate and the second face of the plate have unequal cross-sectional areas, and (2) the difference between the pressure exerted on the first face and the pressure exerted on the second face is constant, then (3) the net force on the plate is not constant, but varies. Thus, for example, when a pressure P_1 is exerted on a first face having a cross-sectional area A_1 , and a pressure P_2 is exerted on a second face having a cross-sectional area A_2 , then the net force (ΔF) on the plate is given by Equation 1:

$$\Delta F = P_1 \cdot A_1 - P_2 \cdot A_2 \quad (1)$$

ΔF corresponds to the additional force on one side of the plate than on the other side of the plate. When a plate is perfectly counterbalanced, ΔF equals 0. It will be appreciated that when a plate is used to form a processing volume, by counterbalancing the plate (i.e., by keeping $\Delta F \geq 0$), a processing volume is maintained. When ΔF is larger than 0, the processing volume is maintained using a greater force than is necessary, requiring extra, unneeded energy.

Again referring to Equation (1), *when A_1 equals A_2 , ΔF equals $A_1 \cdot (P_1 - P_2)$ --that is, when the pressure difference $P_1 - P_2$, ΔP , is constant, ΔF is constant. If ΔP is not constant, then ΔF varies linearly with ΔP . When A_1 does not equal A_2 , then the relationship between ΔF and ΔP is different, a relationship exploited by the present invention. Indeed, it is believed that the net force ΔF is not always proportional to the difference $P_1 - P_2$. Thus, for example, when $A_1 = 100 \text{ in}^2$, $A_2 = 200 \text{ in}^2$, $P_1 = 3,000 \text{ lb-f/in}^2$, and $P_2 = 1,600 \text{ lb-f/in}^2$, then the difference in pressure ($P_1 - P_2$) or $\Delta P = 3,000 \text{ lb-f/in}^2 - 1,600 \text{ lb-f/in}^2 = 1,400 \text{ psid}$ ("psid" denoting pounds per square inch differential). The net force, ΔF , then equals $P_2 \cdot A_2 - P_1 \cdot A_1 = 1,600 \text{ lb-f/in}^2 \cdot 200 \text{ in}^2 - 3,000 \text{ lb-f/in}^2 \cdot 100 \text{ in}^2 = 20,000 \text{ lbf-d}$ ("lbf-d" denoting pound force differential). When, however, $P_1 = 2,500 \text{ lb-f/in}^2$ and $P_2 = 1,100 \text{ lb-f/in}^2$, so that ΔP does not change (i.e., remains 1,400 psid), ΔF then equals $P_2 \cdot A_2 - P_1 \cdot A_1 = 1,100 \text{ lb-f/in}^2 \cdot 200 \text{ in}^2 - 2,500 \text{ lb-f/in}^2 \cdot 100 \text{ in}^2 = -30,000 \text{ lbf-d}$. Thus, even though ΔP remains constant, when the pressure changes, ΔF can change magnitude and direction. It is believed that in a processing system, such as the processing system 600 in Figure 11, ΔF varies with the pressure within a processing volume (P_{vol}), such as the processing volume 983.*

As described below, embodiments of the present invention exploit this relationship to efficiently maintain a processing volume. Using the above example, when P_1 increases, ΔF increases. Referring to Figure 11, P_1 corresponds to the pressure within the processing volume 983 (P_{vol}) and P_2 corresponds to a sealing pressure (P_{seal}). Thus, when P_{vol} increases, and ΔP is kept constant, ΔF unnecessarily increases. ΔF (and thus P_{seal}) can be reduced to conserve energy, while maintaining the processing volume. This non-linear relationship (P_{seal} does not have to track P_{vol}) can be used to reduce the energy input into a processing system used to maintain a processing volume. Energy can be introduced into the processing system at, for example, the input 9444 of the pressure regulator unit 944 of Figure 11. (Italics and underlining added)

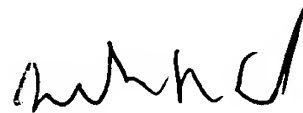
Thus we see that when $A_1 = A_2$ the sealing pressure varies linearly with the processing pressure, and when A_1 is not equal to A_2 then the sealing pressure varies non-linearly with the processing pressure. Biberger et al, Fahringer, or '917 all teach A_1 is not equal to A_2 , therefore Biberger et al, Fahringer, or '917 all teach that the sealing pressure varies non-linearly with the processing pressure.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
7/8/06